

Appl. No. 10/063,279
Amdt. Dated May 5, 2004
Reply to Office action of March 12, 2004

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A mercury vapor discharge fluorescent lamp comprising a light-transmissive glass envelope having an inner surface, a phosphor layer disposed adjacent said inner surface of said glass envelope, and a discharge-sustaining fill gas of mercury vapor and inert gas sealed inside said envelope, said glass envelope comprising an integral annular mercury-insulating portion of said glass envelope~~section located adjacent and including said inner surface thereof and extending to a radial depth within said glass envelope measured from said inner surface~~, said annular mercury-insulating portion~~section~~ being effective to inhibit mercury atoms from absorbing into said glass envelope and amalgamating with sodium atoms therein.

2. (original) A lamp according to claim 1, said glass envelope being made from soda-lime glass.

3. (currently amended) A lamp according to claim 1, said mercury-insulating section portion of said glass envelope comprising a material selected from the group consisting of non-sodium metal ions, non-sodium metal atoms, semi-metallic ions, semi-metallic atoms, and mixtures thereof.

4. (currently amended) A lamp according to claim 1, said mercury-insulating section portion of said glass envelope comprising a material selected from the group consisting of potassium atoms, potassium ions, calcium atoms and calcium ions.

5. (currently amended) A lamp according to claim 1, said radial depth of said mercury-insulating section portion being at least 10 μm .

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6. (currently amended) A lamp according to claim 1, said radial depth of said mercury-insulating section portion being 25-100 μm .

7. (currently amended) A lamp according to claim 1, wherein said mercury-insulating section portion is a compressional section comprising densely packed species, and wherein said densely packed species does not substantially complex, react, or amalgamate with said mercury vapor inside said envelope.

8. (currently amended) A lamp according to claim 1, wherein said mercury-insulating section portion is substantially transmissive of visible light.

9. (original) A lamp according to claim 7, wherein said densely packed species is selected from the group consisting of potassium atoms and potassium ions.

10. (original) A lamp according to claim 7, wherein said densely packed species is selected from the group consisting of calcium atoms and calcium ions.

11. (currently amended) A lamp according to claim 1, wherein said mercury-insulating section portion of said glass envelope is substantially electrically non-conductive.

12. (original) A lamp according to claim 1, said lamp exhibiting fewer than 30 degrees of discoloration at 2000 hours of cyclical operation.

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13. (original) A lamp according to claim 1, said lamp exhibiting fewer than 30 degrees of discoloration at 3000 hours of cyclical operation.

14. (original) A lamp according to claim 1, said lamp having a lumen efficiency of at least 54 lumens/watt at 2000 hours cyclical operation.

15. (original) A lamp according to claim 1, said lamp having a lumen efficiency of at least 54 lumens/watt at 3000 hours of cyclical operation.

16. (original) A lamp according to claim 1, said lamp having a lumen maintenance of at least 0.88 at 2000 hours of cyclical operation.

17. (original) A lamp according to claim 1, said lamp having a lumen maintenance of at least 0.88 at 3000 hours of cyclical operation.

18. (currently amended) A mercury vapor discharge fluorescent lamp comprising a light-transmissive glass envelope having an inner surface, a phosphor layer disposed adjacent said inner surface of said glass envelope, a mercury barrier layer disposed adjacent said phosphor layer, and a discharge-sustaining fill gas of mercury vapor and inert gas sealed inside said envelope, said mercury barrier layer comprising a material selected from the group consisting of potassium salts, ~~non-sodium metal ions, non-sodium metal atoms, semi-metallic ions, and semi-metallic atoms,~~ calcium salts and mixtures thereof, said mercury barrier layer being effective to inhibit mercury atoms from absorbing into said glass envelope and amalgamating with sodium atoms therein.

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19. (previously presented) A lamp according to claim 18, said mercury barrier layer comprising at least 0.5 weight percent potassium.

20. (original) A lamp according to claim 19, said mercury barrier layer being 10-100 nm thick.

21. (canceled).

22. (previously presented) A mercury vapor discharge fluorescent lamp comprising a light-transmissive glass envelope having an inner surface, a mercury barrier layer disposed adjacent said inner surface of said glass envelope, a phosphor layer disposed adjacent said mercury barrier layer, and a discharge-sustaining fill gas of mercury vapor and inert gas sealed inside said envelope, said mercury barrier layer being a compressional layer of densely packed non-activated and substantially electrically non-conductive tin oxide.

23. (previously presented) A lamp according to claim 22, said tin oxide barrier layer being 5-200 nanometers thick.

24. (currently amended) A mercury vapor discharge fluorescent lamp comprising a light-transmissive glass envelope having an inner surface, a phosphor layer disposed adjacent said inner surface of said glass envelope, and a discharge-sustaining fill gas of mercury vapor and inert gas sealed inside said envelope, said phosphor layer comprising at least one ~~non-sodium metal ion~~ potassium species to provide a mercury barrier therein, said mercury barrier of said phosphor layer being effective to inhibit mercury atoms from absorbing into said glass envelope and

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amalgamating with sodium atoms therein.

25. (canceled).

26. (currently amended) A lamp according to claim 24, wherein said ~~metal~~ potassium species is a potassium salt selected from the group consisting of potassium chloride, potassium nitrate, potassium borate, and mixtures thereof.

27. (original) A lamp according to claim 1, said lamp being a high wattage fluorescent lamp and having a lumen maintenance of at least 0.6 at 2000 hours of cyclical operation.

28. (original) A lamp according to claim 1, said lamp being a high wattage fluorescent lamp and having a lumen maintenance of at least 0.6 at 3000 hours of cyclical operation.

29. (previously presented) A lamp according to claim 18, said mercury barrier layer being a potassium salt barrier layer.

30. (new) A lamp according to claim 24, said potassium species being a potassium salt.

31. (new) A lamp according to claim 1, said annular mercury-insulating portion of said glass envelope comprising potassium species and being formed through ion exchange with sodium atoms initially present in the glass envelope by dipping the

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envelope in a potassium melt.

32. (new) A lamp according to claim 1, said annular mercury-insulating portion of said glass envelope extending from said inner surface thereof to a radial depth measured radially outward from said inner surface.